

What is claimed is:

1. An imaging system for capturing an image of a sample with a camera, the imaging system comprising:

an imaging box having a set of walls enclosing an interior cavity;

a camera mount configured to position the camera relative to a fixed datum on one of said walls for viewing by the camera;

a light transmission device; and

a moveable stage apparatus including a transport mechanism and a stage configured to support the sample within the interior cavity, said stage being coupled to the transport mechanism for movement of the sample to one of a plurality of positions in said interior cavity, said transport mechanism and said light transmission device cooperating to direct light reflected or emitted from said sample to said fixed datum to capture said image by said camera.

2. The system of claim 1 wherein the light transmission device comprises a mirror that reflects light emitted from the sample towards the fixed datum.

3. The system of claim 2 wherein the fixed datum is a fixed axis passing through the camera mount and perpendicular to a vertical wall of the imaging box.

4. The system of claim 3 wherein the light transmission device rotates about the fixed axis.

5. The system of claim 3 wherein the moveable stage apparatus rotates the stage about the fixed axis.

6. The system of claim 5 wherein the stage is substantially horizontal during rotation about the fixed axis.
7. The system of claim 5 wherein the light transmission device rotates with the stage about the fixed axis.
8. The system of claim 1 wherein the camera mount is situated on a vertical wall of the set of walls.
9. The system of claim 1 wherein a portion of the stage that supports the sample is transparent.
10. The system of claim 9 wherein the portion comprises a transparent wire array.
11. The system of claim 1 further including a processor configured to provide control signals to a motor coupled to the moveable stage apparatus.
12. The system of claim 11 wherein the processor is further configured to perform crash protection during movement of the moveable stage apparatus.
13. The system of claim 1 further including a hardware based crash protection measure disposed on the moveable stage.
14. The system of claim 1 further including a structured light source configured to transmit structured light onto the sample.

15. The system of claim 14 wherein the processor is further configured to produce a structured light representation using a structured light image obtained from said one of a plurality of positions in said interior cavity.

16. An imaging apparatus used in capturing an image of a sample, the imaging apparatus comprising:

an imaging box including an interior cavity for receiving the sample;

a stage for supporting the sample;

a first linear actuator attached to the imaging box and capable of positioning the moveable stage in a first direction; and

a second linear actuator attached to the first linear actuator, attached to the stage, and capable of positioning the moveable stage in a second direction,

wherein said first linear actuator and said second linear actuator cooperate to position the stage at one of a plurality of positions in said interior cavity.

17. The apparatus of claim 16 further including a light reception device and a light transmission device, wherein the light transmission device is coupled to the imaging box and configured to transmit light emitted from the sample to a fixed datum of the light reception device.

18. The apparatus of claim 17 wherein the light transmission device comprises a mirror that reflects light emitted from the sample towards the fixed datum.

19. The apparatus of claim 17 wherein the fixed datum is a fixed axis perpendicular to a vertical wall of the imaging box.

20. The apparatus of claim 19 wherein the light reception device rotates about the fixed axis.

21. The apparatus of claim 16 wherein the first direction and the second direction are orthogonal.

22. The apparatus of claim 21 wherein the first linear actuator provides vertical positioning for said stage and the second linear actuator provides horizontal positioning for said stage.

23. The apparatus of claim 16 wherein imaging box comprises a camera mount adapted to receive a camera, the camera capable of capturing an image of the sample within the interior cavity.

24. An imaging apparatus for capturing an image of a sample, the imaging apparatus comprising:

an imaging box including an interior cavity for receiving the sample;

a stage for supporting the sample; and

a positioning arm rotably coupled to the stage and rotably coupled to the imaging box such that the stage remains substantially horizontal for any rotational position of the positioning arm relative the imaging box; and

a mirror attached to positioning arm, the mirror configured to reflect light emitted from the sample at least partially along a fixed datum.

25. The apparatus of claim 24 wherein the stage rotates about the fixed axis within the imaging box.

26. The apparatus of claim 24 wherein the positioning arm is configured to rotate between a first position and a second position, wherein the first and second position have a different angle relative to the fixed axis.
27. The apparatus of claim 24 wherein the positioning arm further includes a second degree of freedom relative to said positioning arm, said second degree of freedom capable of adapting the position of said stage relative to said mirror.
28. The apparatus of claim 24 wherein a portion of the stage is transparent.
29. A method for imaging a sample, the sample supported by a stage moveable within an imaging box, the imaging box coupled to a camera configured to capture an image of the sample, the method including:
- moving the stage to a first position in the imaging box;
 - capturing a first image of the sample from the first position using the camera;
 - moving the stage to a second position in the imaging box, wherein the second position has a different angle relative to a fixed datum associated with the camera than the first position; and
 - capturing a second image of the sample from the second position using the camera.
30. The method of claim 29 further including capturing a third image of the sample from the first position.
31. The method of claim 30 wherein the first image comprises luminescent data and the third image comprises photographic data.
32. The method of claim 29 wherein the first and second position have a different angle relative to the camera.

33. A stage apparatus for use with an imaging system for capturing an image of a sample with a camera, the imaging system including an imaging box having a set of walls defining an interior cavity, and a camera mounted relative to a fixed datum on one of said walls, said stage apparatus comprising:

a light transmission device; and

a transport mechanism; and

a stage configured to support the sample within the interior cavity, said stage being coupled to the transport mechanism for movement of the sample to one of a plurality of positions in said interior cavity,

wherein said transport mechanism and said light transmission device cooperate to direct light reflected or emitted from said sample on the stage to said fixed datum to capture said image by said camera.

34. The system of claim 33 wherein the light transmission device comprises a mirror that reflects light emitted from the sample towards the fixed datum.

35. The system of claim 34 wherein the light transmission device rotates about the fixed datum.

36. The system of claim 33 wherein the stage is substantially horizontal for all of said plurality of positions.

37. The system of claim 33 wherein a portion of the stage that supports the sample is transparent.